**Level 3 Distinguishing between organic substances**

**1)** Identify the reagents, conditions required, and observations linked to species, to enable the following

pairs of chemicals to be distinguished from each other.

(i) Aqueous solutions of propanamine and propanamide.

(ii) Propanone and propanal.

(iii) Propanoyl chloride and propyl propanoate.

**2)** Devise a method for distinguishing between the three liquid compounds, butan-1-ol, butanoic acid, and

butanoyl chloride, using only blue litmus paper and water.

Explain each of the observations in your method, with reference to the structure of the organic compounds.

**3)** Describe how you could distinguish between methylpropan-2-ol and butan-1-ol and butan-2-ol , using chemical tests on the alcohols and / or their oxidation products.

**4)** Explain a laboratory prodecure that would allow the following pairs of compounds to be distinguished. In your answers, you should include:

* the reagent used
* the expected result for any reactions that may or may not occur
* the structural formulae of the organic product(s) formed when the reaction(s) occur.

**i)**

|  |  |  |
| --- | --- | --- |
| Chemistry 3 | and | **Chemistry 3** |

**ii)**

|  |  |  |
| --- | --- | --- |
| Chemistry 3 | and | Chemistry 3 |

**5)** Explain a laboratory prodecure that would allow the following pairs of compounds to be distinguished. In your answers, you should include:

* the reagent used
* the expected result for any reactions that may or may not occur
* the structural formulae of the organic product(s) formed when the reaction(s) occur.



**6)** Describe a test that could distinguish between an amide and an amine

**7)** Explain how you could distinguish  from propanone 

Your explanation should include:

• the reagents used and the conditions needed

• the expected observations.

**8)** Compound **X**, an isomer of Compound **A**, C3H6O3, can exist as enantiomers. It reacts with acidified

dichromate solution to give Compound **Y**, C3H4O3. Both compounds **X** and **Y** react with sodium

carbonate to produce carbon dioxide gas. Identify Compounds **X** and **Y** and justify your answers in

relation to the information above.

**9)** A colourless liquid is known to be a branched-chain alcohol with the molecular formula C5H11OH.

Investigations of this liquid show the following features:

• It does not rotate the plane of polarised light.

• It reacts with acidified potassium dichromate solution.

• It reacts with concentrated sulfuric acid. The product of this reaction decolourises bromine water.

Use the features listed to name and draw the alcohol described. Justify your answer.

**10)** Devise a method for distinguishing between propanoyl chloride, 2-amino-3-methylbutane, pentanal,

4-chlorobutanoic acid. Each test should use either moist red litmus paper or an acidified solution of potassium permanganate.

**11)** Discuss how to test propanal and propanoic acid to demonstrate that they are different from each other AND different from propan-1-ol. Include the observations that would allow each substance to be identified as a result of these tests.

**12)** The identity of a colourless liquid is unknown. It is thought to be one of the following: ethanoyl

chloride (CH3COCl) or ethanol (CH3CH2OH) or 2-methyl propan-2-ol ((CH3)3COH) or hex-1-ene

(CH2= CHCH2CH2CH2CH3).

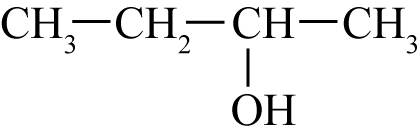
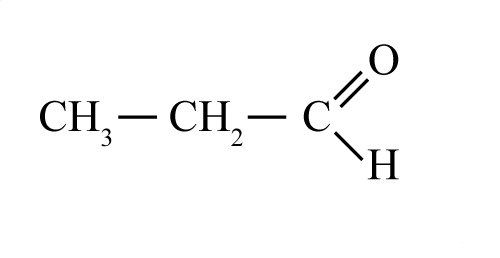
Devise a scheme using bromine water and acidified dichromate to identify the colourless liquid.

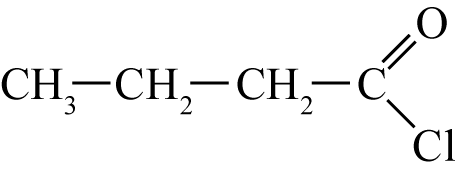
Describe the observations expected at each stage (equations not required).

**13)** Describe a chemical test that would distinguish between each of the following pairs of substances. For

each test, identify the reagents used, and link the observations to any reactions that may or may not

occur.

(i)  and 

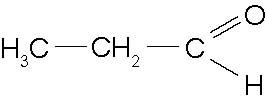
(ii)  and 

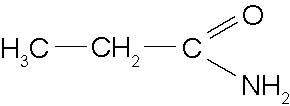
**14)** Describe chemical tests that could be used to distinguish between the compounds in each of the pairs of substances below. For each test description:

• include reagents used, and

• link the observed results to the reactions occurring at the functional groups present in the organic molecules.

Do **NOT** use the same test more than once.

**(a)**  and 

**(b)**  and 

© 2015 <http://www.chemicalminds.wikispaces.com>

NCEA questions and answers reproduced with permission from NZQA